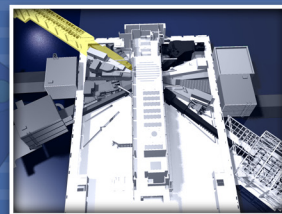


# INSTRUMENT

BEAM LINE

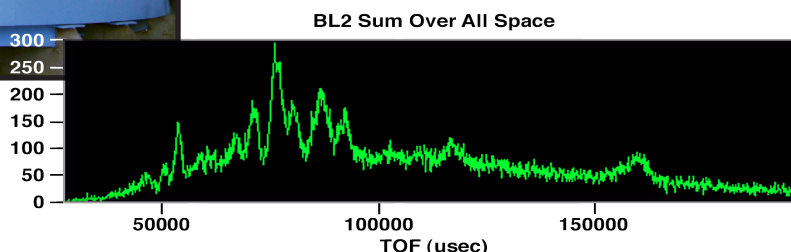
2

# Fact Sheet



## BACKSCATTERING SPECTROMETER

The backscattering spectrometer on beam line 2 is designed to provide extremely high-energy resolution near the elastic peak, enabling studies of the diffusive dynamics of molecules on the atomic length scale (quasielastic neutron scattering). This instrument features very high flux and a dynamic range in energy transfer that is approximately five times greater than what is available on comparable instruments today. In addition, the instrument provides the unique capability of shifting the incident neutron bandwidth, enabling inelastic scattering to 18 meV of energy transfer with a resolution of 0.1% of the energy transfer.



*The first neutron diffraction peaks taken at SNS were of mica at the Backscattering Spectrometer; they are clearly visible after counting 118k neutrons.*

### SPECIFICATIONS

Si 111	
Elastic energy	2.08 meV
Bandwidth	$\pm 258 \mu\text{eV}$
Resolution (elastic)	$2.2 - 2.7 \mu\text{eV}$
Q-range (elastic)	$0.17 \text{ \AA}^{-1} < Q < 2.0 \text{ \AA}^{-1}$
Solid angle	2.0 sr
	4.0 sr (upgrade)

Si 311 (upgrade)	
Elastic energy	7.64 meV
Bandwidth	$\pm 1700 \mu\text{eV}$
Resolution (elastic)	$10 \mu\text{eV}$
Q-range (elastic)	$0.35 \text{ \AA}^{-1} < Q < 3.8 \text{ \AA}^{-1}$
Solid angle	4.0 sr

### FUTURE EVENTS

- Fall 2006: Initial users will arrive for experiments.
- Summer 2007: Power level to exceed 100kW.
- Fall 2007: General User Program for first three instruments opens.

### SIGNIFICANT EVENTS

- March 2006: Completed Instrument Readiness Review for low power operations.
- May 19, 2006: Backscattering Spectrometer received operational approval.
- May 23, 2006: The first diffraction pattern was measured from a 25g sample of fluorinated mica placed in a 3cm x 3cm neutron beam with a time averaged proton power on target of 185 watts. Four detector tubes counted for 822 seconds, making this instrument the first in recording time-of-flight data.
- May 31, 2006: The first energy transfer resolved spectrum was measured from a sample of 4-methyl pyridine N-oxide which exhibited the expected series of tunneling peaks.

FOR MORE INFORMATION, CONTACT BACKSCATTERING SPECTROMETER STAFF

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[www.sns.gov/users/instrument\\_systems/instruments/inelastic/backscattering.shtml](http://www.sns.gov/users/instrument_systems/instruments/inelastic/backscattering.shtml)



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